

Chapter 1. Purpose of and Need for the Los Vaqueros Project

BACKGROUND

Contra Costa Water District (CCWD) of Concord, California, originally known as Contra Costa County Water District, was formed in 1935 under the authority of the State Water Code. CCWD purchases its water supply from the Central Valley Project (CVP), operated by the U.S. Bureau of Reclamation (Reclamation). The State Water Code empowers CCWD to perform any activity necessary to furnish water for a present or future beneficial use within CCWD's boundaries (Figure 1-1). CCWD operates both raw water distribution facilities and water treatment and treated water distribution facilities. CCWD presently supplies raw water to Antioch, Oakley Water District, Pittsburg, Southern California Water Company (serving West Pittsburg), Martinez, 10 major industries, 36 smaller industries and businesses, and approximately 35 agricultural users. Approximately 400,000 customers receive water from CCWD, including wholesale and retail customers throughout north-central and east Contra Costa County.

The Contra Costa Canal system is CCWD's principal water supply and delivery system (Figure 1-1). This system obtains water diverted directly from the Delta and from flows from the CVP storage releases from Shasta, Folsom, and Trinity Reservoirs into the Sacramento River rediverted in the Delta to CCWD's system at Rock Slough. Diversions and rediversions are then made in the Sacramento-San Joaquin Delta (Delta) to CCWD's system at Rock Slough. Under Water Service Contract I75r-3401 (amended) with Reclamation, CCWD can divert up to 195,000 acre-feet per year (af/yr) of water from Rock Slough. Because of physical constraints in CCWD's delivery system, however, approximately 135,000 af/yr can be delivered at this time based on historic diversion patterns. Currently, CCWD diverts approximately 120,000-130,000 af/yr of water from Rock Slough depending on the year type. CCWD can also divert up to 26,780 af/yr of water from Mallard Slough in the Delta (Water Rights License No. 3167 and Permit No. 19856). This diversion has been made in lieu of diverting water through the Contra Costa Canal, but only minor diversions have been made from Mallard Slough in recent years because of unacceptable water quality.

NEED TO IMPROVE WATER QUALITY

Since 1940, CCWD has obtained its water from the Delta, which is subject to wide variations in salt and mineral concentrations. This single source of water supply also has made CCWD and its customers vulnerable to any artificial or natural phenomenon that could cause a catastrophic deterioration of Delta water quality.

The diversion point for CCWD's water from Reclamation, Rock Slough, fluctuates in salinity (dissolved salts) when salt water intrudes from the San Francisco Bay (Bay) in dry years and, to a lesser extent, when Delta agricultural drainage occurs, especially during wet periods. Saltwater intrusion typically occurs during summer, and Delta agricultural drainage problems generally occur in winter.

The most serious rise in salt concentration at Rock Slough occurs during dry and critical years. When Sierra Nevada and Cascade Range runoff and releases from storage are ample, the rivers flowing into the Delta create a freshwater barrier that prevents the salty water of the Bay from intruding into the Delta in large amounts. Water quality degrades, however, during dry periods, such as the droughts of 1928-1935, 1976-1977, and the present drought. Delta export pumping by the CVP and State Water Project (SWP) in the southern Delta exacerbates the problem by further reducing the freshwater outflow to the Bay.

These water quality changes in Delta water are noticeable to those who drink the water or use the water in commercial and industrial processes. The typical seasonal degradation in water quality as Delta salinities increase is objectionable to many CCWD customers, costly to all residential and industrial users, and a health risk for some individuals.

CCWD is committed to supplying its customers with the highest quality water practicable and providing all reasonable protection of the supply from any known or potential source of hazardous contamination. CCWD Resolution No. 88-45 states in part that:

CCWD is committed to reducing the concentration of sodium and chloride in the District's water, thereby reducing household and landscape irrigation concerns and industrial and manufacturing costs caused by the fluctuating sodium and chloride level of the District's Delta source. . . .

CCWD-treated water consistently meets all existing state and federal primary (health-related) drinking water standards. It may be difficult to meet primary drinking water standards expected to be established by the U.S. Environmental Protection Agency (EPA) in the near future without modifying CCWD's treatment processes. Necessary equipment modifications to meet anticipated primary drinking water standards are being planned at CCWD's existing water treatment plant and are being incorporated into the construction of the Randall-Bold Water Treatment Plant.

CCWD's conventional water treatment processes, however, do not lower the concentration of parameters for which secondary standards exist, such as sodium, chloride, total dissolved solids (TDS), and water hardness. These parameters diminish the overall water quality delivered to municipal customers and industry. Existing secondary (aesthetic and consumer-acceptance-related) standards for chloride and TDS sometimes cannot be met with the present CCWD system, particularly during critical years. Levels of sodium and water hardness, and associated health risks to some individuals, also can be high during periods of water quality degradation.

In May 1987, CCWD's Board of Directors adopted desired quality objectives for water distributed within its service area. The acceptable levels of sodium and chloride were established at 50 milligrams per liter (mg/l) and 65 mg/l, respectively. Concentrations of these parameters as measured at Rock Slough have frequently exceeded this goal (Figure 1-2). For comparison, the chloride levels in drinking water of nearby East Bay Municipal Utility District (EBMUD) are approximately 2-5 mg/l.

NEED TO IMPROVE WATER RELIABILITY

CCWD's water is also vulnerable to Delta emergencies, including those from chemical spills, agricultural drainage, and levee failures. For example, the Andrus Island levee failure in June 1972 caused Rock Slough chloride concentrations to increase to nearly 450 mg/l, almost twice the secondary maximum contaminant level for chloride content in drinking water (250 mg/l).

The CCWD system is dependent on nearly continuous operation of all four of its pumping plants along the Contra Costa Canal. If any one of these facilities were forced out of service because of a Delta levee failure, severe earthquake, drought, Delta chemical spill, or other Delta water quality problems, CCWD could meet unconstrained water demands for only a few peak days by drawing from its existing small storage reservoirs (Contra Loma, Martinez, and Mallard), which provide a combined total of approximately 5,000 acre-feet (af) of water when full.

This 3- to 5-day supply during peak demands (equivalent to a 7- to 10-day supply during average demands) is insufficient for a district serving water to approximately 400,000 customers and numerous industries and businesses. The CCWD canal system consists of a chain of components, and failure of any

individual unit jeopardizes operation of the entire system. Additional reliability storage is necessary in the event of protracted supply disruptions that could result from Delta levee failures, chemical spills, drought, or a severe earthquake.

Nearby water districts and water agencies in southern California maintain emergency supplies substantially greater than current CCWD supplies. For instance, EBMUD has an emergency storage equivalent to 120 days of average daily demand, the City of San Francisco has reserve storage equivalent to 130 days of average daily demand, and Alameda County Flood Control and Water Conservation District maintains emergency storage of about 136 days of average daily demand. In southern California, San Diego County Water Authority has reserve storage equivalent to 60-90 days of average daily demand, and Metropolitan Water District of Southern California maintains emergency storage of about 90 days of average daily demand.

CCWD conducted detailed risk analyses and concluded that reliability storage should be sufficient to satisfy 3 months of demand during peak water use at buildout of its system in 2025 (56,000 af) in the event of an emergency. Customer cutbacks of an additional 25% over and above current conservation measures are assumed during the emergency. A total of 26,000 of the 56,000 af of emergency storage could be used to enhance water quality during dry and critical years. The remaining 30,000 af of reliability storage (estimated 1 peak-month demand in 2025) are to be used only for emergencies that threaten CCWD's water supply and its ability to provide water service for domestic, sanitary, and fire protection purposes. Such emergencies would include those that threaten CCWD's ability to meet all state and federal primary drinking water standards.

PROJECT PURPOSE AND OBJECTIVES

Primary Objectives

CCWD's basic project purpose is to improve the quality of water supplied to CCWD customers and minimize seasonal quality changes, and to improve the reliability of the CCWD supply. This project purpose has been identified since the 1960s. Recently, detailed engineering studies and economic evaluations have shaped the development of specific project objectives and planning assumptions to facilitate project design.

CCWD's specific primary goals and objectives are:

1. to improve the quality of water supplied to CCWD customers and minimize seasonal quality changes, specifically by providing consumers with water quality at the tap of 65 mg/l chloride and 50 mg/l sodium 100% of the time; to supply CCWD customers with the highest quality water practical; and to provide all reasonable protection of the supply from any known or potential source of contamination hazard;
2. to improve the reliability of the CCWD supply by providing for emergency storage to supply 75% of the maximum projected 3-month demand in 2025 (56,000 af), with the provision that up to 26,000 af of this emergency storage can be used to enhance water quality during dry and critical years; and
3. to meet these water quality and reliability objectives by developing and constructing a project by 1995 with an estimated cost to CCWD in 1988 dollars of \$350 million and by minimizing costs (CCWD Resolution No. 88-45).

Secondary Objectives

Secondary objectives consistent with the primary water quality and reliability objectives and stated in Resolution No. 88-45 are to:

1. provide flood control benefits,
2. maintain and enhance fish and wildlife resources, and
3. offer recreational opportunities.

Other objectives, which may be considered as planning objectives, include such concerns as environmental acceptability, flexibility, ability to supply all CCWD customers, institutional considerations, and practicality. Certain objectives also serve as specific criteria for evaluating the proposed project and alternatives. These objectives are to:

- provide an environmentally acceptable project,
- provide an energy-efficient project,
- provide for flexibility in operating and managing the reservoir,
- not operate the project in conjunction with a peripheral canal or increase the export of Delta water from northern California without additional voter approval, and
- provide fishery benefits in the Delta to the extent practicable.

PROJECT PLANNING ASSUMPTIONS

Several important assumptions have been made for planning potential project alternatives to meet CCWD's project purposes. The most basic of these are the projected water demands for the future CCWD service area. The water demand projections are described below. Detailed information regarding the development of these water demands are contained in CCWD's draft Section 404(b)(1) Alternatives Analysis for Meeting Water Quality and Reliability Objectives (1991b), available from CCWD.

Planning Area

CCWD developed several water demand scenarios as a part of its planning process using the planning areas shown in Figure 1-3. Buildout water demands were estimated for the potential planning areas based on planned land uses and the "water duty" method. The planned land uses were inventoried based on approved general plan land use maps for each city and the September 1989 draft of the Contra Costa County general plan. A water duty is the estimated total annual amount of water used per acre of a specific land use. Annual water demands were calculated by multiplying the water duty by the number of acres of a particular land use. Water demands were estimated for buildout conditions. Buildout is defined as the point at which all land is fully developed according to existing general plan land use plans and guidelines for development. The buildout demand projections were then adjusted to reflect long-term conservation practices and system water losses.

The planning area for the Los Vaqueros Project is defined as the service area as of fall 1989 (CCWD's existing boundaries and sphere of influence [SOI]) and the areas that extend beyond this boundary that are within the planning jurisdiction of CCWD raw water customers: the Oakley Water District and its